Bridge Inspection Basics

Road Scholar Core Course #9

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Bridge Project Manager
Butler, Fairman & Seufert, Inc.

March 5th, 2019

Agenda

- Why Inspect Bridges?
- What do we Inspect?
- Inspection Types and Critical Findings
- Project Schedule
- County Summary Reports and BIAS
- Load Ratings and Scour
- LPA's Responsibility
- What's Next?

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Why Inspect Bridges?

1. Ensure public safety!

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Why Inspect Bridges?

- Silver Bridge Collapse, 1967
- Point Pleasant, WV
- 46 dead
- Led to National Bridge Inspection Standards (NBIS)

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Why Inspect Bridges?

- Mianus River Bridge Collapse, 1983
- Greenwich, CT
- 3 people died
- Led to new scour provisions

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Why Inspect Bridges?

- Schoharie Creek Bridge Collapse, 1987
- Fort Hunter, NY
- 10 dead
- Led to fracture critical member provisions

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Why Inspect Bridges?

2. Compliance

- Comply with federal and state laws, rules, and policies
- Federal-aid program
- Failure to comply puts LPA at risk for losing current and future federal funding

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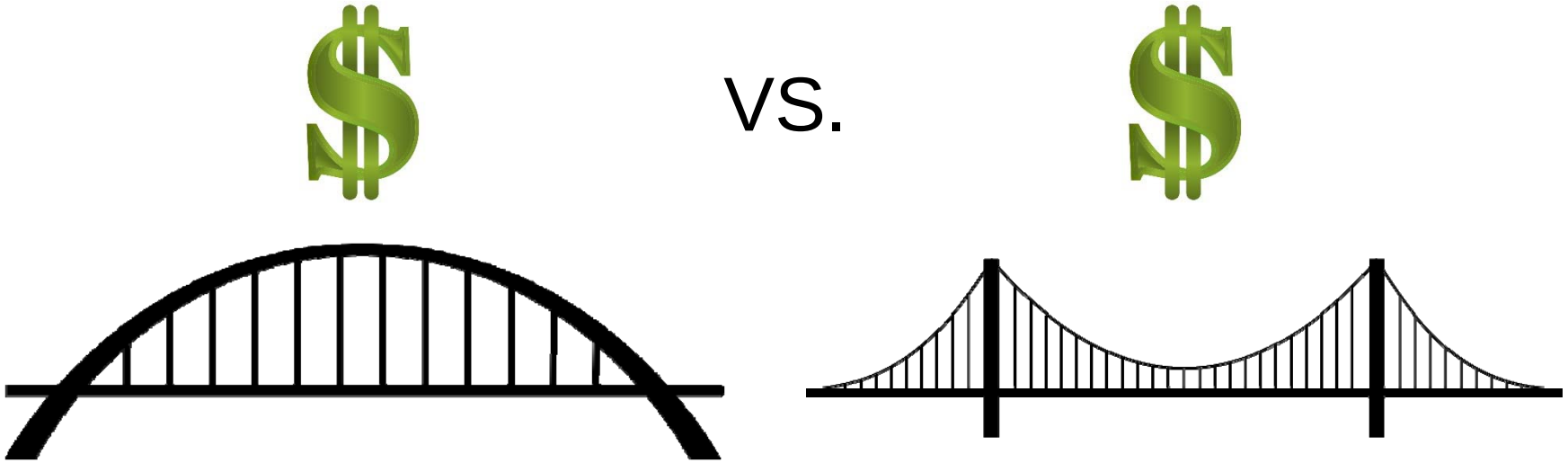
Why Inspect Bridges?

3. Responsible spending

- To provide for the efficient use of resources in maintaining bridges
- Asset management tool



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What do we Inspect?

NBIS Bridge Definition:

"A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet* between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening."

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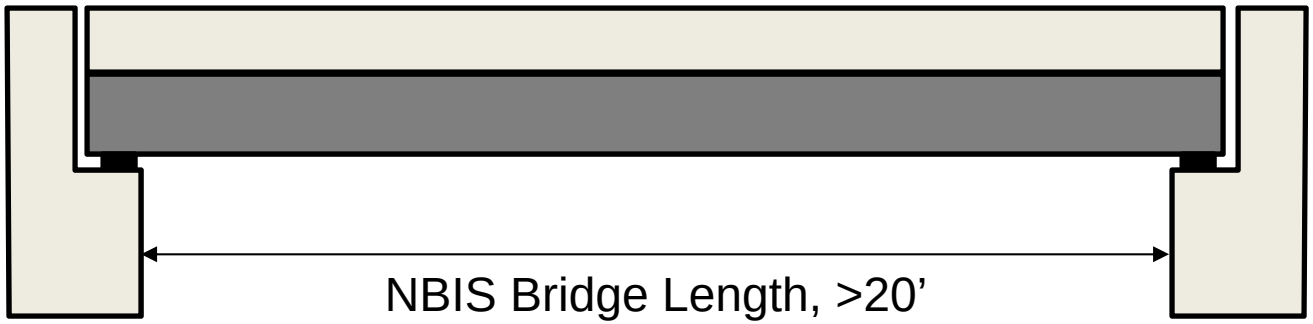
What do we Inspect?

- Single Span Bridges



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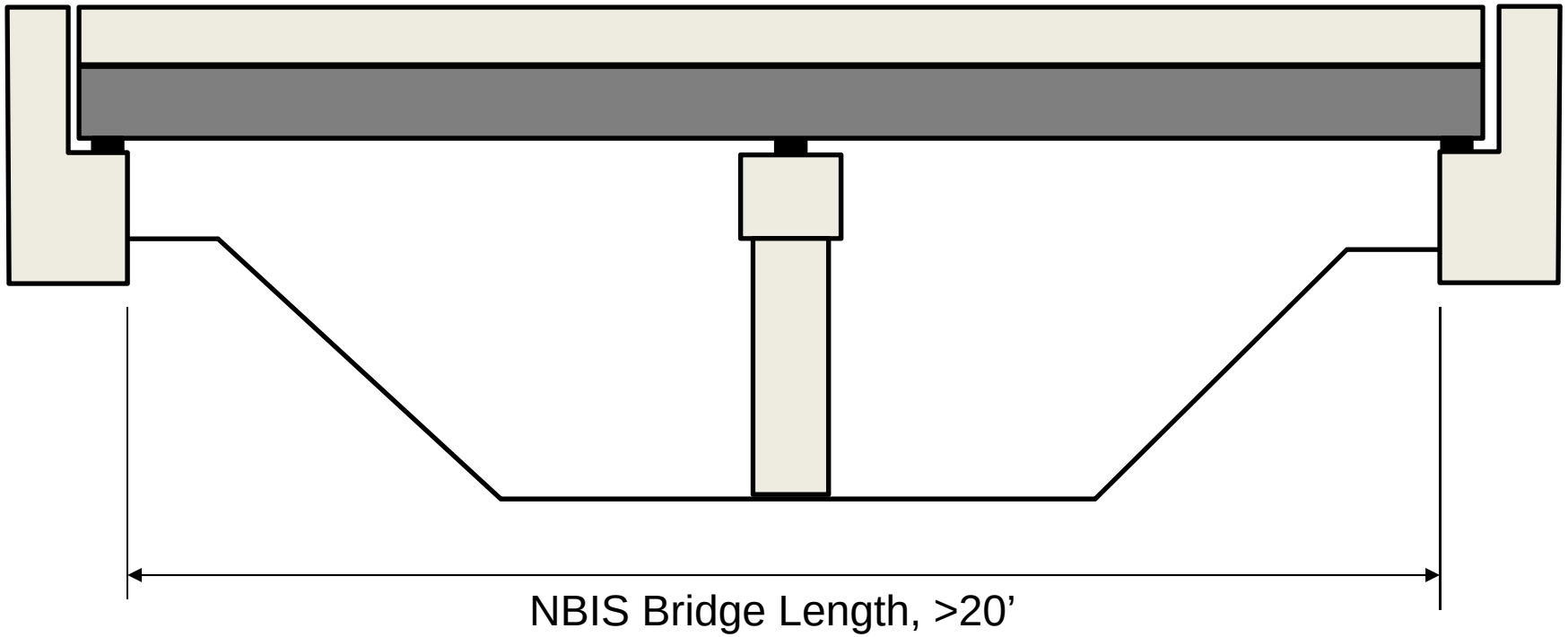
What do we Inspect?

- Multi-Span Bridges



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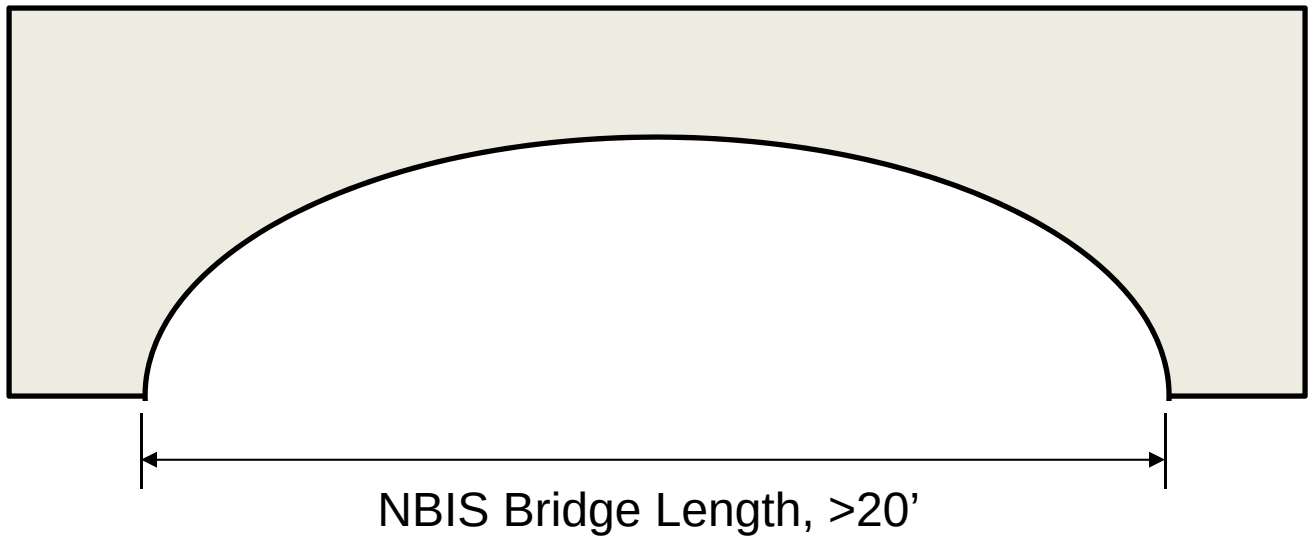
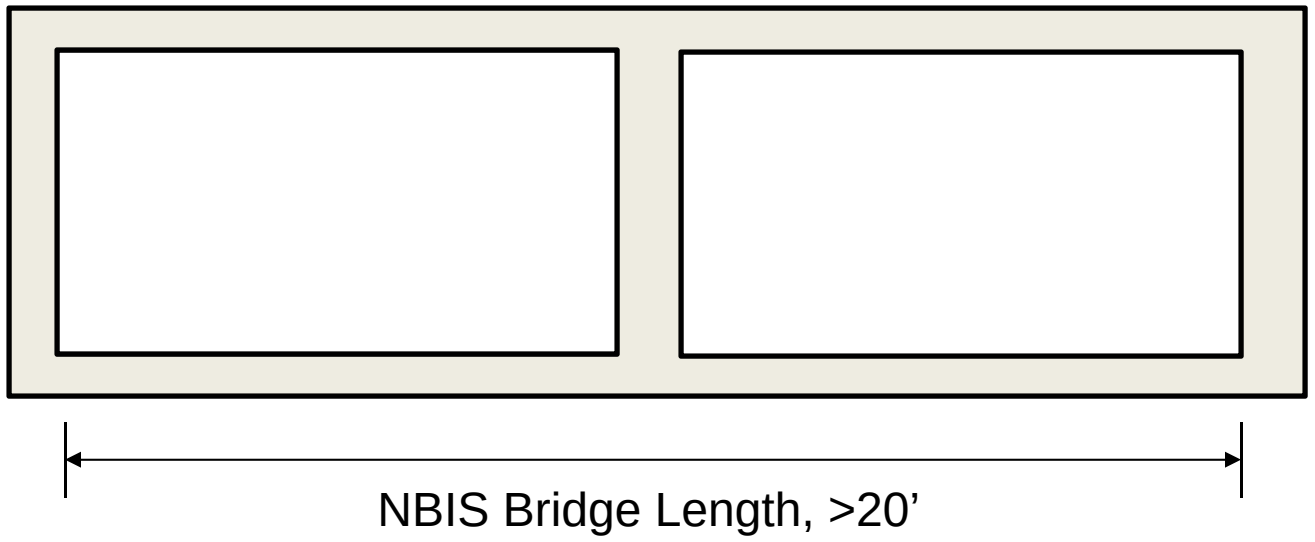
What do we Inspect?

- Arch Bridges



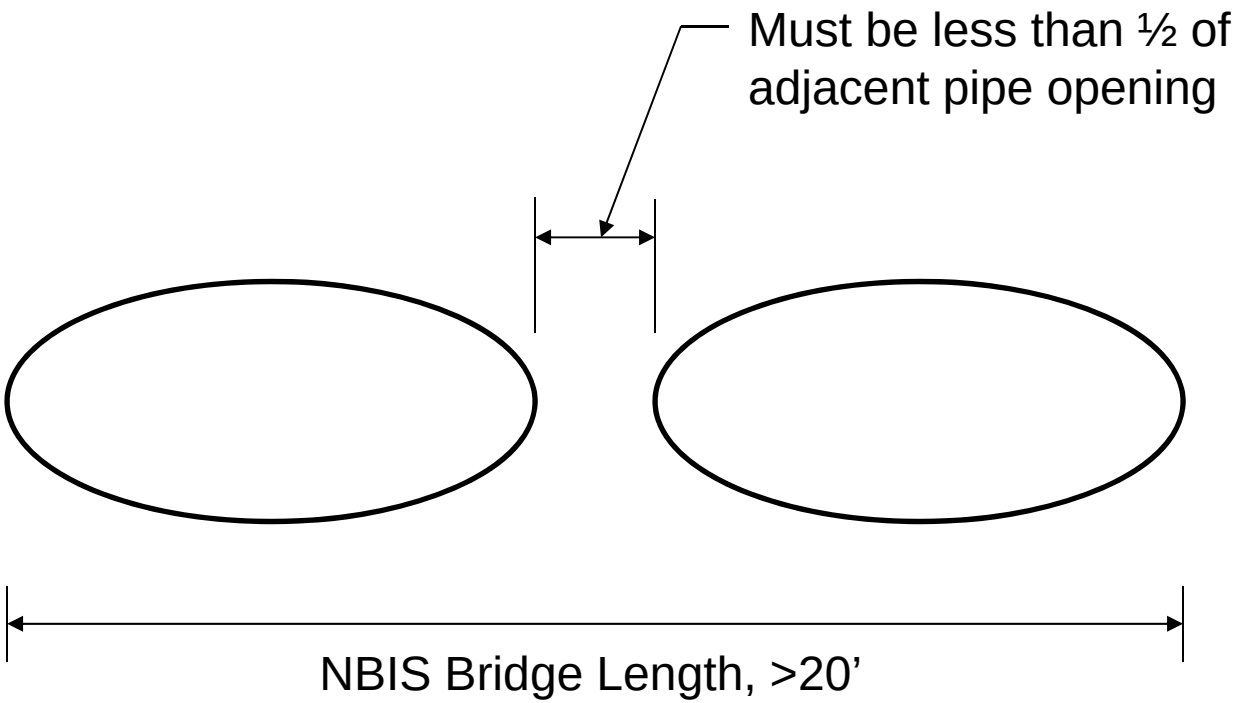
What do we Inspect?

- Box Culverts



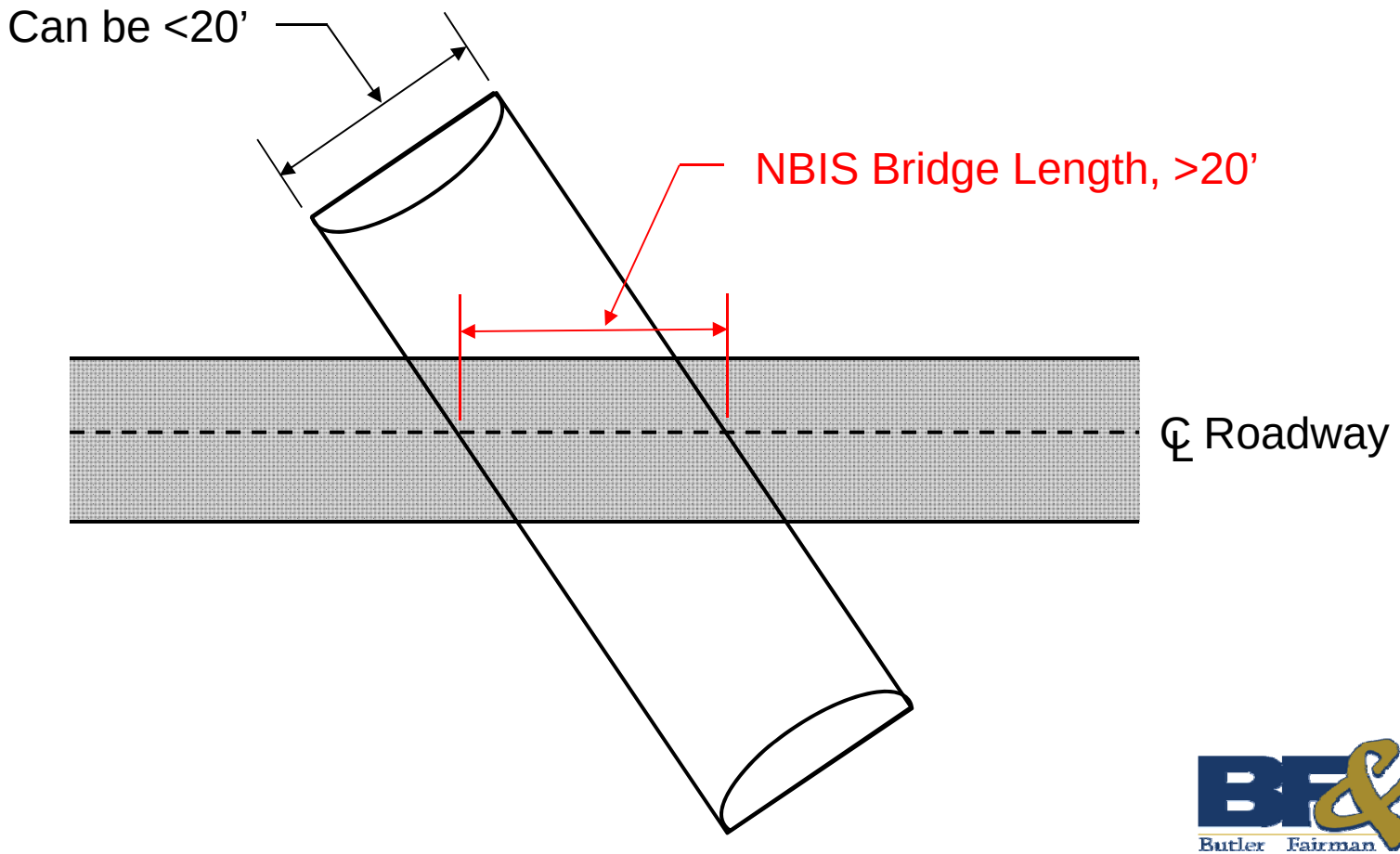
What do we Inspect?

- Pipe Culverts



What do we Inspect?

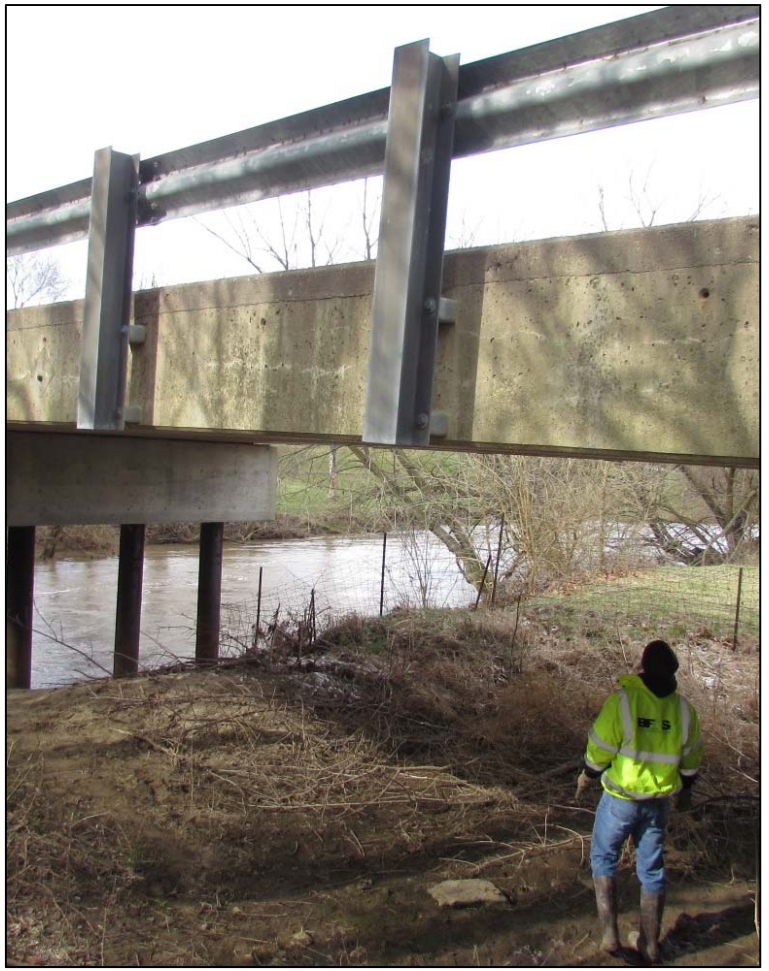
- Measured along the centerline of roadway



Inspection Types

Routine Inspection

- Required for all bridges
- Consists of observations and/or measurements to determine physical and functional condition of bridge
- Walk-around type inspection
- Team Leader certification



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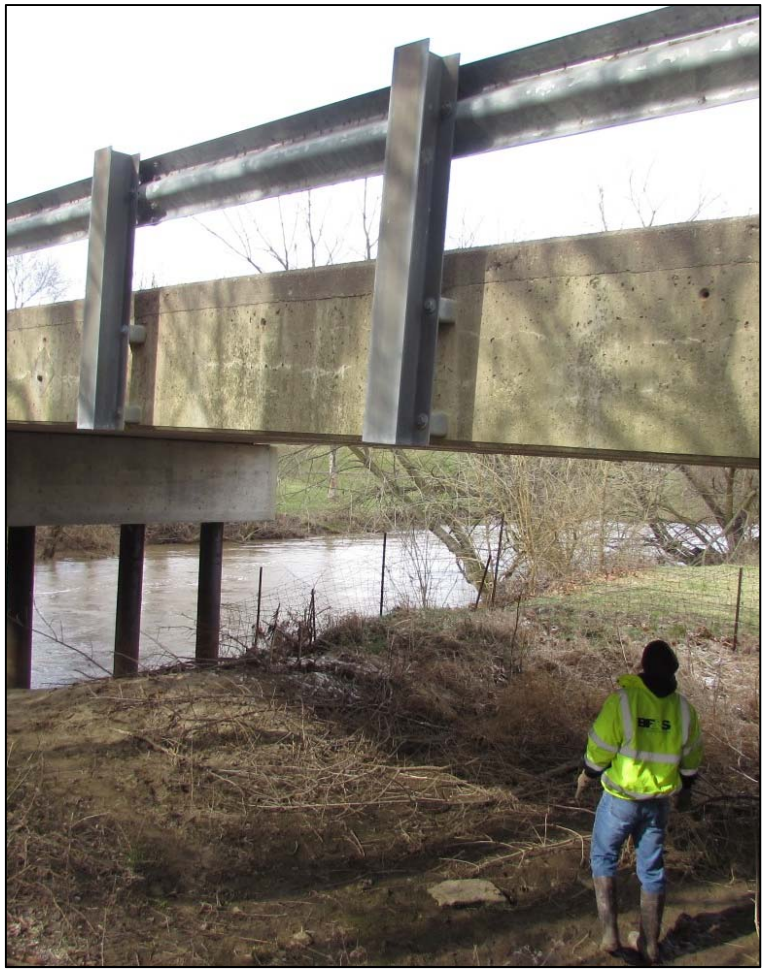
Inspection Types

Routine Inspection

- Regularly scheduled
- Maximum frequency of 24 months
- Maximum of 12 months for bridges with a rating of a 4 or less for:
  - Deck, Superstructure, Substructure, Culvert



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Inspection Types

Fracture Critical Inspections

- Fracture critical members are steel members in tension, whose failure would probably cause all, or a portion of, the bridge to collapse
- Some common examples: steel trusses, steel two-girder bridges, most railroad flat car bridges

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Inspection Types

Fracture Critical Inspections

- Requires additional fracture critical training, qualifications
- “Arm’s length” inspection of fracture critical members or components
- Many inspections require special equipment and traffic control

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Inspection Types

Fracture Critical Inspections

- Detailed inspection and report
- Looking for cracks in tension areas
- Noting deterioration of individual members

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Inspection Types

Fracture Critical Inspections

- Regularly scheduled
- Maximum frequency of 24 months
- Maximum frequency of 12 months for fracture critical members with rating of 4 or less

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Inspection Types

Underwater Inspections

- Required for substructure units in water that cannot be waded or probed, even at lowest flow of year
- Requires additional training, certifications
  - Commercial dive training

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Inspection Types

Underwater Inspections

- Detailed inspection and report
- Looking for
  - Scour at foundations
  - Structural issues
  - Deterioration
  - Channel migration

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Inspection Types

Underwater Inspections

- Regularly scheduled
- Typically scheduled for low-flow time of year
- Maximum frequency of 60 months
- 48, 36, 24, or 12 month frequency used based on condition and changes

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Inspection Types

Special Inspections

- Examine a portion of a bridge in more detail, or at a greater or lesser frequency, than is standard for routine inspections
- May provide follow-up after routine, damage, or initial inspection

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Inspection Types

Special Inspections

- Some examples:
  - Fatigue category E and E' details
  - Welded cover plates
  - Hangers
  - Hinge or pin connections
  - Defects/deterioration warranting extra scrutiny
  - Cable-stayed, suspension, and movable bridges

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Inspection Types

Special Inspections

- It's now common to have a special inspection to inspect fracture critical members rated a 4 or less
  - This is completed between full fracture critical inspections in order to meet 12 month frequency requirements

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Inspection Types

Special Inspections

- Usually requires fracture critical or other training, certifications
- “Arm’s length” inspection
- May require special equipment, traffic control
- Usually requires detailed inspection and report

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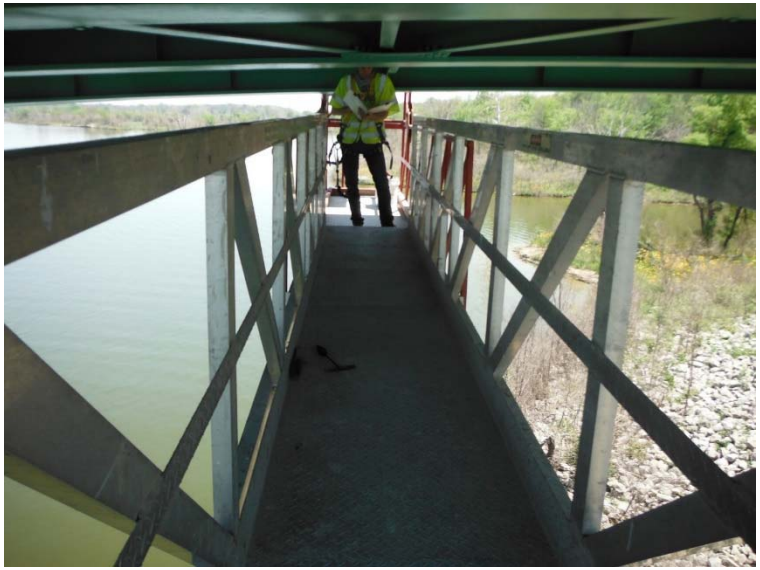
Inspection Types

Special Inspections

- Regularly scheduled
- Maximum frequency of 60 months
- Maximum frequency of 12 months for details rated a 4 or less



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Inspection Types

Initial Inspection

- Baseline inspection
- Completed on every new bridge, after a rehabilitation, or when configuration changes
- Also for bridges not previously inventoried

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Inspection Types

Initial Inspection

- Use bridge plans as guide
- Determine what inspections are required in future
- Inspection data required in BIAS within 90 days of opening to traffic

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Inspection Types

Damage Inspections

- Unscheduled inspection to assess structural damage from environmental or human actions
- Shall be completed ASAP
  - not more than 7 days after event
- May require critical finding and/or bridge closure

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Critical Findings

- A **critical finding** is a structural or safety related deficiency that requires immediate follow-up inspection or action
- Typically triggered by inspector during scheduled inspection
- Can also be triggered by bridge owner

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Critical Findings

- Inspector first notifies employee in responsible charge (ERC), then notifies the State Program Manager (SPM)
  - Via phone and/or email
- Following notification, critical findings need to be documented within BIAS within 24 hours.

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Critical Findings

- Immediate actions ARE:
  - Close bridge, close lanes or shoulders, restrict traffic, add barrels or barricades, plate hole, quick repair, quick load rate, re-inspection, etc.
- Immediate actions ARE NOT:
  - Replace bridge, rehab bridge, repair bridge when crew is free, wait for all load ratings in county to be completed

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Critical Findings

- Immediate action timeline
  - Intent is days, not weeks or months
- Once the immediate action is completed, the critical finding can be closed out by the SPM
- After close-out, further action may still be needed by bridge owner
  - Replace, rehab, or repair

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Project Schedule

Contract Phases

- Year 1: Phase I — Inspect all bridges
- Year 2: Phase IA — Inspect poor condition bridges
- Year 3: Phase II — Inspect all bridges
- Year 4: Phase IIA — Inspect poor condition bridges

- Years 1-2: Interim I — Additional inspections
- Years 3-4: Interim II — Additional inspections

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Project Schedule

1. Field Inspections

- After Notice to Proceed (NTP)
- During compliance months
  - If more than one compliance month, need to keep bridge in same month as previous inspection month
- Avoid bad weather, snow, or high water

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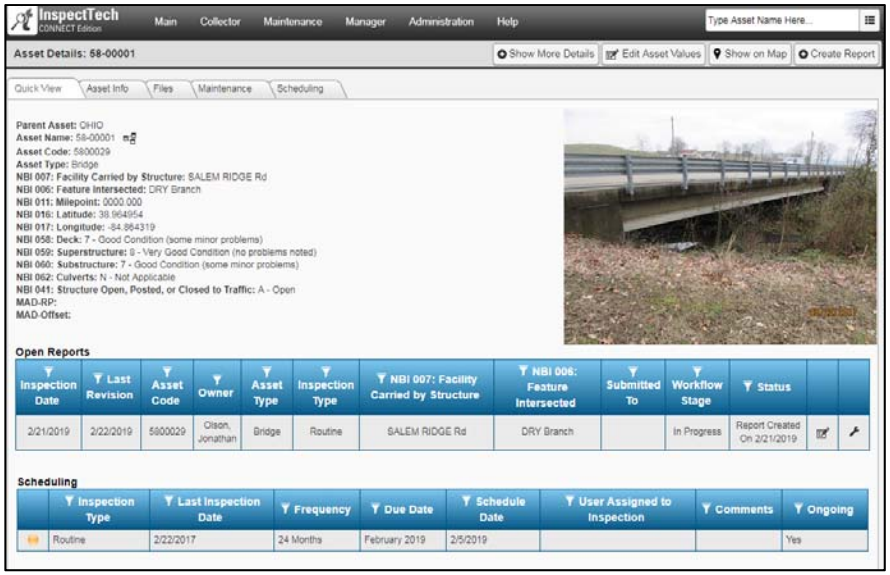
Project Schedule

2. BIAS Reports

- Start report in BIAS and update inspection date by end of compliance month
- Reports complete and approved in BIAS within 60 days of inspection



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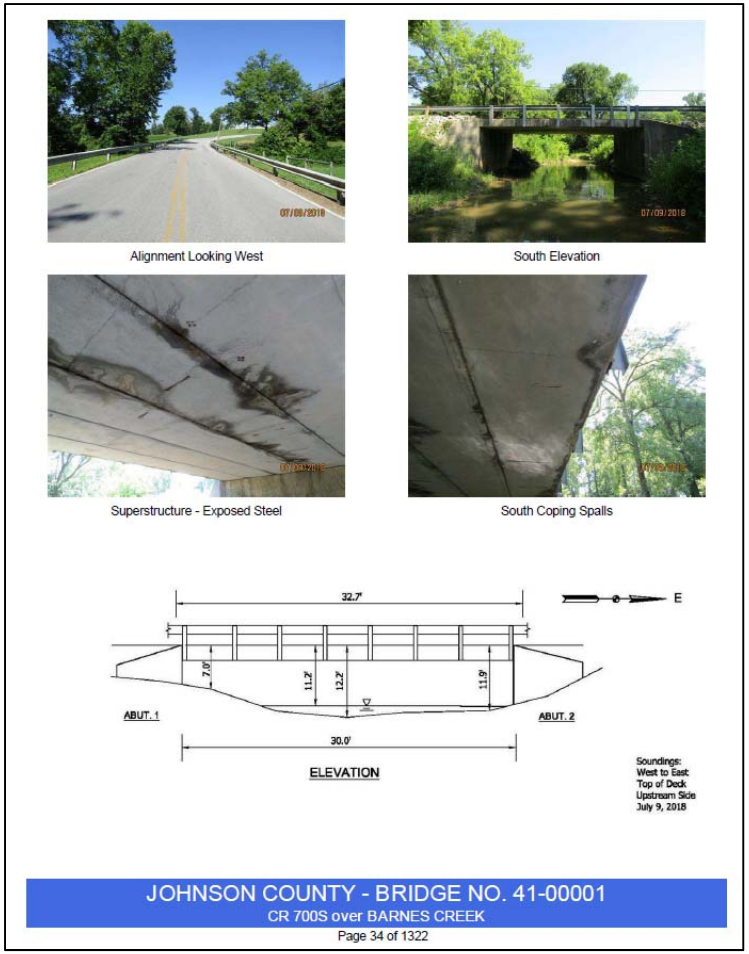
Project Schedule

3. Draft Summary Report

- Typically due 3 or 4 months after date of 1st inspection
  - Depends on phase
- Consultant to deliver and review report with County
- County to review and sign off on report



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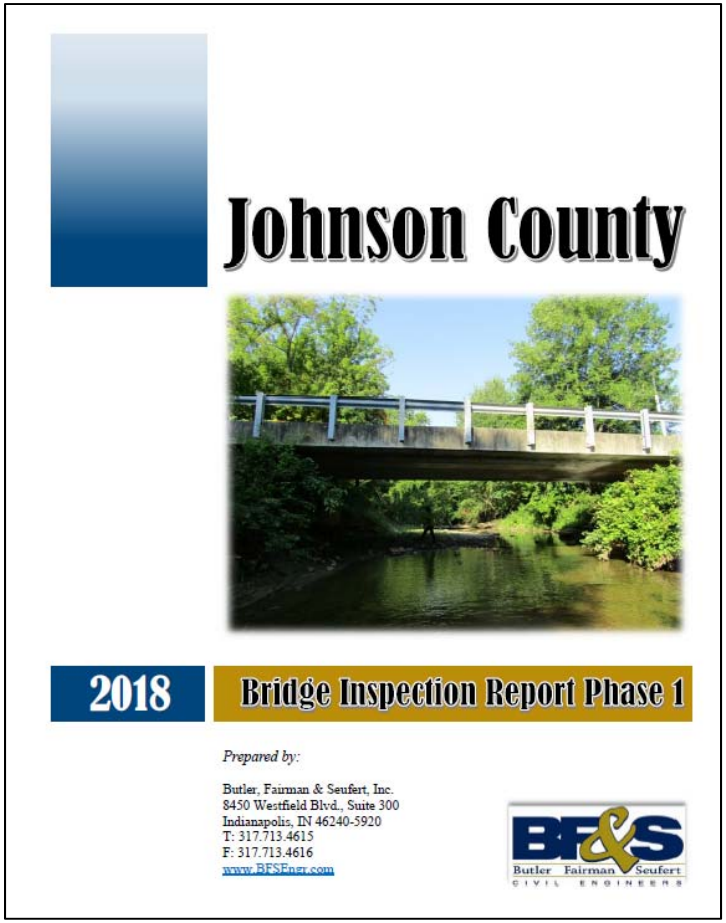
Project Schedule

4. Final Summary Report

- County will receive final reports 1 month after draft report
- Final reports also submitted in ERMS, INDOT's long term file storage system



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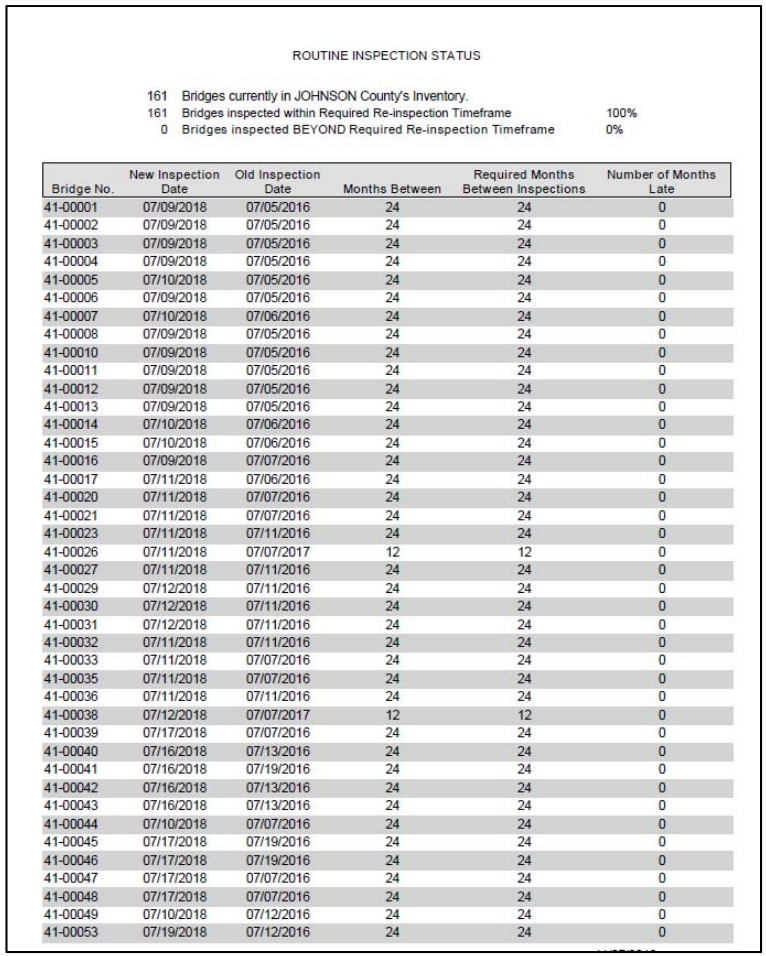
County Summary Reports

Summary Tables

- Priority list for major work
- Req'd inspections and inspection dates
- Load posted bridges
- Scour critical bridges
- Summary of changes
- Maintenance items
- Etc.



ROUTINE INSPECTION STATUS

161 Bridges currently in JOHNSON County's Inventory.
161 Bridges inspected within Required Re-inspection Timeframe 100%
0 Bridges inspected BEYOND Required Re-inspection Timeframe 0%

Bridge No.	New Inspection Date	Old Inspection Date	Months Between	Required Months Between Inspections	Number of Months Late
41-00001	07/09/2018	07/05/2016	24	24	0
41-00002	07/09/2018	07/05/2016	24	24	0
41-00003	07/09/2018	07/05/2016	24	24	0
41-00004	07/09/2018	07/05/2016	24	24	0
41-00005	07/10/2018	07/05/2016	24	24	0
41-00006	07/09/2018	07/05/2016	24	24	0
41-00007	07/10/2018	07/06/2016	24	24	0
41-00008	07/09/2018	07/05/2016	24	24	0
41-00010	07/09/2018	07/05/2016	24	24	0
41-00011	07/09/2018	07/05/2016	24	24	0
41-00012	07/09/2018	07/05/2016	24	24	0
41-00013	07/09/2018	07/05/2016	24	24	0
41-00014	07/10/2018	07/06/2016	24	24	0
41-00015	07/10/2018	07/06/2016	24	24	0
41-00016	07/09/2018	07/07/2016	24	24	0
41-00017	07/11/2018	07/06/2016	24	24	0
41-00020	07/11/2018	07/07/2016	24	24	0
41-00021	07/11/2018	07/07/2016	24	24	0
41-00023	07/11/2018	07/11/2016	24	24	0
41-00026	07/11/2018	07/07/2017	12	12	0
41-00027	07/11/2018	07/11/2016	24	24	0
41-00029	07/12/2018	07/11/2016	24	24	0
41-00030	07/12/2018	07/11/2016	24	24	0
41-00031	07/12/2018	07/11/2016	24	24	0
41-00032	07/11/2018	07/11/2016	24	24	0
41-00033	07/11/2018	07/07/2016	24	24	0
41-00035	07/11/2018	07/07/2016	24	24	0
41-00036	07/11/2018	07/11/2016	24	24	0
41-00038	07/12/2018	07/07/2017	12	12	0
41-00039	07/17/2018	07/07/2016	24	24	0
41-00040	07/16/2018	07/13/2016	24	24	0
41-00041	07/16/2018	07/19/2016	24	24	0
41-00042	07/16/2018	07/13/2016	24	24	0
41-00043	07/16/2018	07/13/2016	24	24	0
41-00044	07/10/2018	07/07/2016	24	24	0
41-00045	07/17/2018	07/19/2016	24	24	0
41-00046	07/17/2018	07/19/2016	24	24	0
41-00047	07/17/2018	07/07/2016	24	24	0
41-00048	07/17/2018	07/07/2016	24	24	0
41-00049	07/10/2018	07/12/2016	24	24	0
41-00053	07/19/2018	07/12/2016	24	24	0

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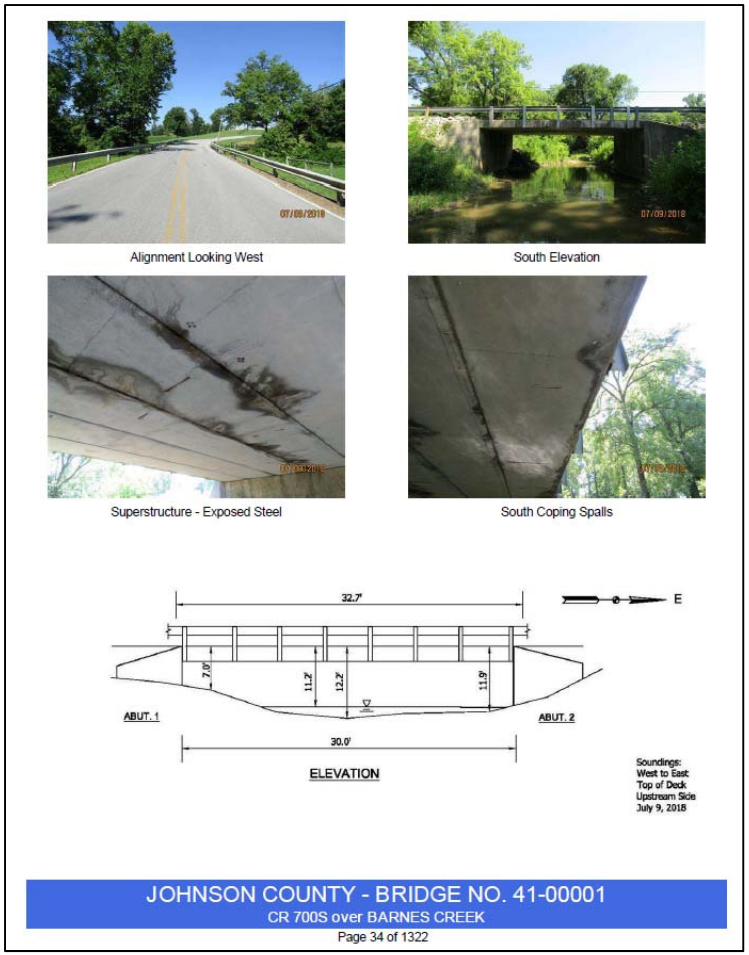
County Summary Reports

SIA Reports

- Pictures documenting bridge, deficiencies
- Elevation sketch with channel measurements
- Condition ratings
- Description of deficiencies
  - location, size, severity



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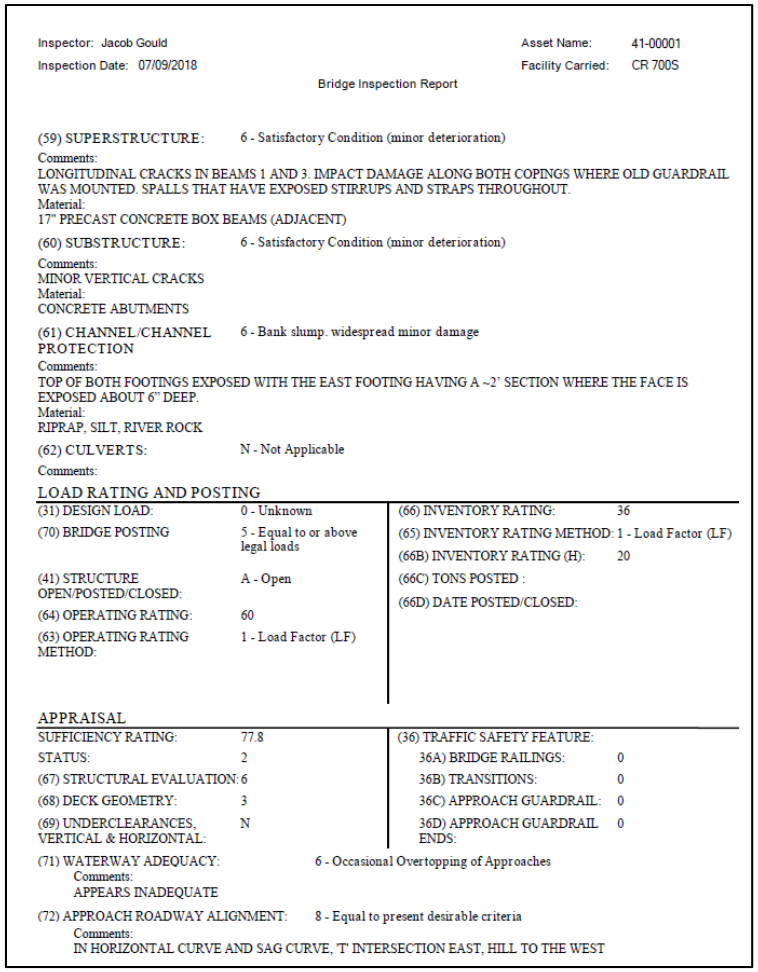
County Summary Reports

SIA Reports

- Location, structure type, year built, geometry, inspection dates
- Load rating and posting
- Recommendations for major work, maintenance
- Sufficiency rating and status



Inspector: Jacob Gould
Inspection Date: 07/09/2018
Asset Name: 41-00001
Facility Carried: CR 700S

Bridge Inspection Report

(59) SUPERSTRUCTURE: 6 - Satisfactory Condition (minor deterioration)
Comments:
LONGITUDINAL CRACKS IN BEAMS 1 AND 3. IMPACT DAMAGE ALONG BOTH COPINGS WHERE OLD GUARDRAIL WAS MOUNTED. SPALLS THAT HAVE EXPOSED STIRRUPS AND STRAPS THROUGHOUT.
Material:
17" PRECAST CONCRETE BOX BEAMS (ADJACENT)

(60) SUBSTRUCTURE: 6 - Satisfactory Condition (minor deterioration)
Comments:
MINOR VERTICAL CRACKS
Material:
CONCRETE ABUTMENTS

(61) CHANNEL/CHANNEL PROTECTION 6 - Bank slump. widespread minor damage
Comments:
TOP OF BOTH FOOTINGS EXPOSED WITH THE EAST FOOTING HAVING A ~2' SECTION WHERE THE FACE IS EXPOSED ABOUT 6" DEEP.
Material:
RIPRAP, SILT, RIVER ROCK

(62) CULVERTS: N - Not Applicable
Comments:

LOAD RATING AND POSTING

(31) DESIGN LOAD:	0 - Unknown	(66) INVENTORY RATING:	36
(70) BRIDGE POSTING	5 - Equal to or above legal loads	(65) INVENTORY RATING METHOD:	1 - Load Factor (LF)
		(66B) INVENTORY RATING (H):	20
(41) STRUCTURE OPEN/POSTED/CLOSED:	A - Open	(66C) TONS POSTED :	
		(66D) DATE POSTED/CLOSED:	
(64) OPERATING RATING:	60		
(63) OPERATING RATING METHOD:	1 - Load Factor (LF)		

APPRAISAL

SUFFICIENCY RATING:	77.8	(36) TRAFFIC SAFETY FEATURE:	
STATUS:	2	36A) BRIDGE RAILINGS:	0
(67) STRUCTURAL EVALUATION:	6	36B) TRANSITIONS:	0
(68) DECK GEOMETRY:	3	36C) APPROACH GUARDRAIL:	0
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL:	N	36D) APPROACH GUARDRAIL ENDS:	0

(71) WATERWAY ADEQUACY: 6 - Occasional Overtopping of Approaches
Comments:
APPEARS INADEQUATE

(72) APPROACH ROADWAY ALIGNMENT: 8 - Equal to present desirable criteria
Comments:
IN HORIZONTAL CURVE AND SAG CURVE, 'T' INTERSECTION EAST, HILL TO THE WEST

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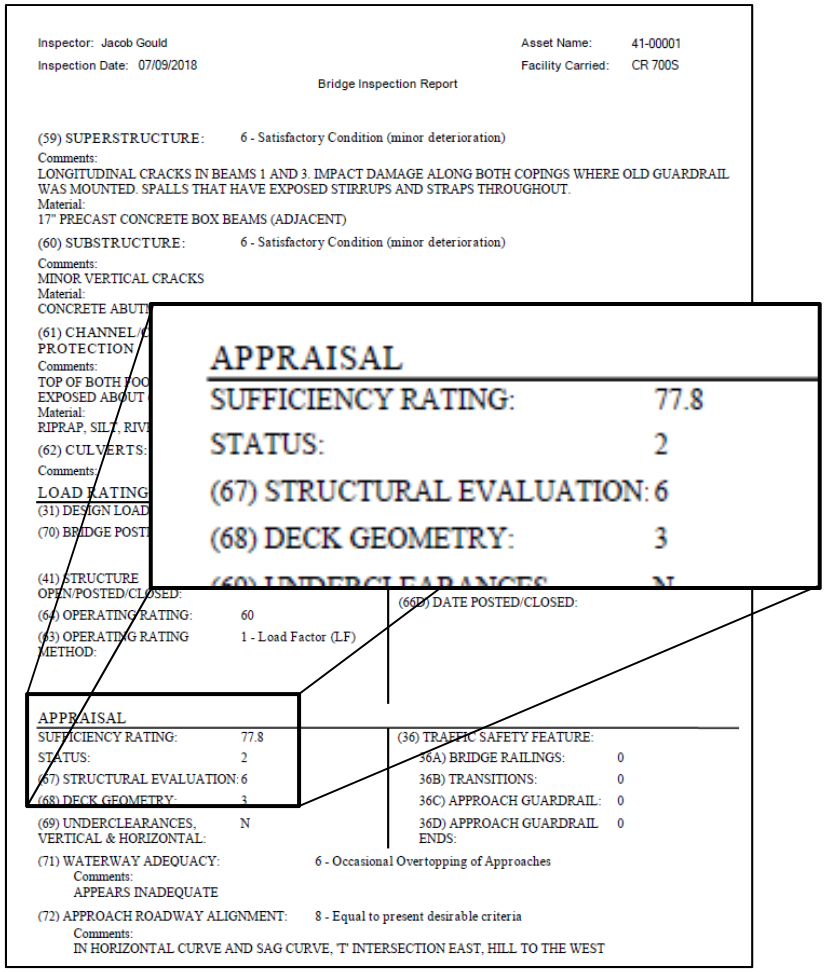
County Summary Reports

Sufficiency Rating

- Score 0-100
- Automatically calculated based on:
  - Condition
  - Geometry
  - ADT
  - Load rating
  - Appraisal items
  - Etc.



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Inspection Date: 07/09/2018
Asset Name: 41-00001
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Bridge Inspection Report

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Comments:
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Material:
17" PRECAST CONCRETE BOX BEAMS (ADJACENT)

(60) SUBSTRUCTURE: 6 - Satisfactory Condition (minor deterioration)
Comments:
MINOR VERTICAL CRACKS
Material:
CONCRETE ABUT

(61) CHANNEL
PROTECTION
Comments:
TOP OF BOTH TOO
EXPOSED ABOUT
Material:
RIPRAP, SILT, RIV

(62) CULVERTS:
Comments:

LOAD RATING
(31) DESIGN LOAD
(70) BRIDGE POST

(41) STRUCTURE OPEN/POSTED/CLOSED:
(66) OPERATING RATING: 60
(63) OPERATING RATING METHOD: 1 - Load Factor (LF)
(66D) DATE POSTED/CLOSED:

APPRAISAL

SUFFICIENCY RATING:	77.8	(36) TRAFFIC SAFETY FEATURE:	
STATUS:	2	36A) BRIDGE RAILINGS:	0
(67) STRUCTURAL EVALUATION:	6	36B) TRANSITIONS:	0
(68) DECK GEOMETRY:	3	36C) APPROACH GUARDRAIL:	0
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL:	N	36D) APPROACH GUARDRAIL ENDS:	0

(71) WATERWAY ADEQUACY: 6 - Occasional Overtopping of Approaches
Comments:
APPEARS INADEQUATE

(72) APPROACH ROADWAY ALIGNMENT: 8 - Equal to present desirable criteria
Comments:
IN HORIZONTAL CURVE AND SAG CURVE, 'T' INTERSECTION EAST, HILL TO THE WEST

APPRAISAL

SUFFICIENCY RATING:	77.8
STATUS:	2
(67) STRUCTURAL EVALUATION:	6
(68) DECK GEOMETRY:	3
(69) UNDERCLEARANCES,	N

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County Summary Reports

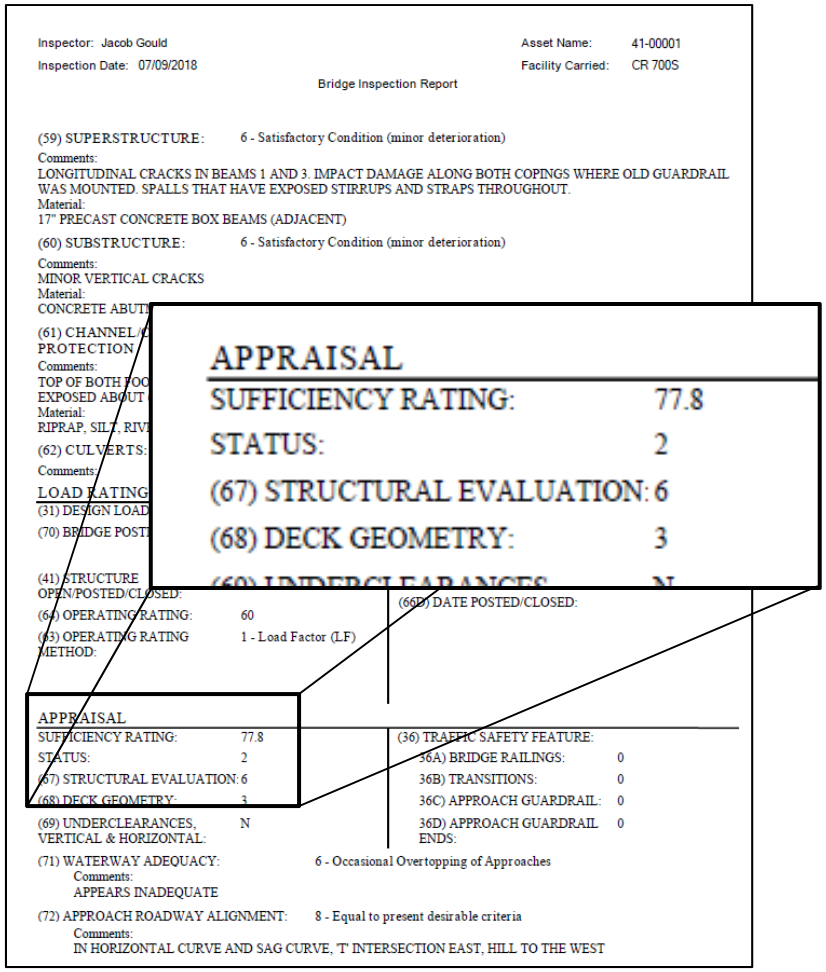
Status

0 = Not Deficient (ND)

1 = Structurally Deficient (SD)

2 = Functionally Obsolete (FO)

- Automatically calculated based on NBI data, similar to sufficiency rating



Inspector: Jacob Gould
Inspection Date: 07/09/2018
Asset Name: 41-00001
Facility Carried: CR 700S

Bridge Inspection Report

(59) SUPERSTRUCTURE: 6 - Satisfactory Condition (minor deterioration)
Comments:
LONGITUDINAL CRACKS IN BEAMS 1 AND 3. IMPACT DAMAGE ALONG BOTH COPINGS WHERE OLD GUARDRAIL WAS MOUNTED. SPALLS THAT HAVE EXPOSED STIRRUPS AND STRAPS THROUGHOUT.
Material:
17" PRECAST CONCRETE BOX BEAMS (ADJACENT)

(60) SUBSTRUCTURE: 6 - Satisfactory Condition (minor deterioration)
Comments:
MINOR VERTICAL CRACKS
Material:
CONCRETE ABUT

(61) CHANNEL
PROTECTION
Comments:
TOP OF BOTH TOO
EXPOSED ABOUT
Material:
RIPRAP, SILT, RIV

(62) CULVERTS:
Comments:

LOAD RATING
(31) DESIGN LOAD
(70) BRIDGE POST

(41) STRUCTURE OPEN/POSTED/CLOSED:
(66) OPERATING RATING: 60
(63) OPERATING RATING METHOD: 1 - Load Factor (LF)
(66D) DATE POSTED/CLOSED:

APPRAISAL

SUFFICIENCY RATING:	77.8
STATUS:	2
(67) STRUCTURAL EVALUATION:	6
(68) DECK GEOMETRY:	3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL:	N

(36) TRAFFIC SAFETY FEATURE:	
36A) BRIDGE RAILINGS:	0
36B) TRANSITIONS:	0
36C) APPROACH GUARDRAIL:	0
36D) APPROACH GUARDRAIL ENDS:	0

(71) WATERWAY ADEQUACY: 6 - Occasional Overtopping of Approaches
Comments:
APPEARS INADEQUATE

(72) APPROACH ROADWAY ALIGNMENT: 8 - Equal to present desirable criteria
Comments:
IN HORIZONTAL CURVE AND SAG CURVE, 'T' INTERSECTION EAST, HILL TO THE WEST

APPRAISAL
SUFFICIENCY RATING: 77.8
STATUS: 2
(67) STRUCTURAL EVALUATION: 6
(68) DECK GEOMETRY: 3

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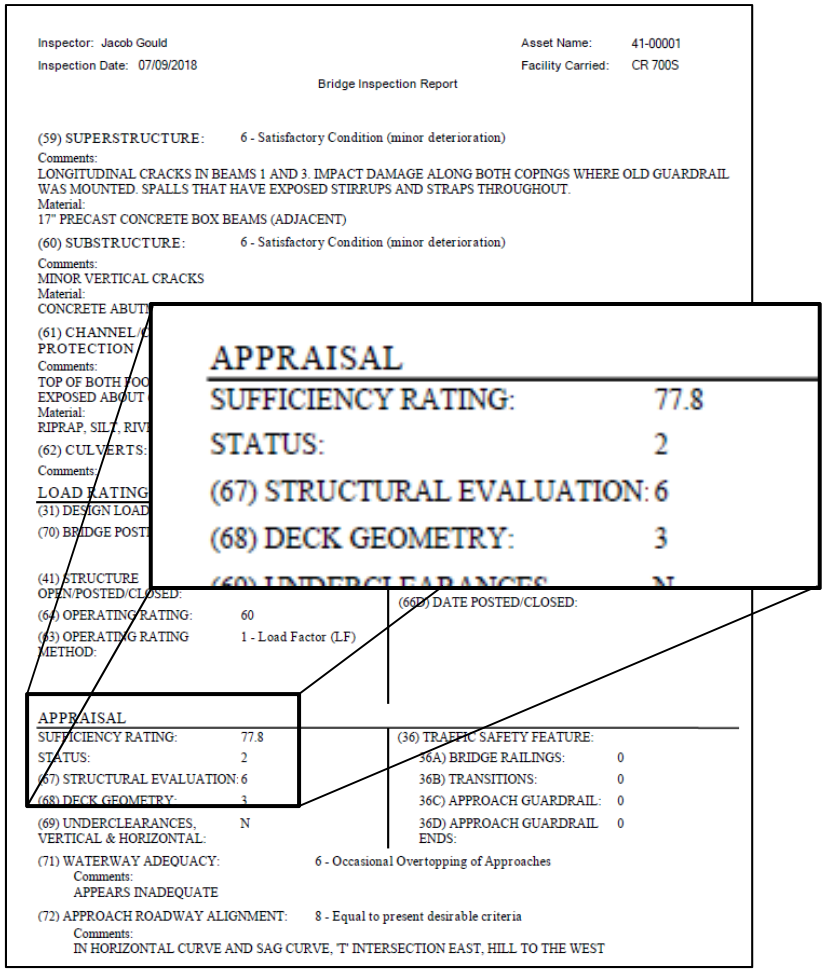
County Summary Reports

Federal Funding Eligibility

- Rehabilitation:
  - S.R. < 80
  - S.D. or F.O.
- Replace:
  - S.R. < 50
  - S.D. or F.O.
- Preventative Maintenance:
  - S.R. ≥ 50



Inspector: Jacob Gould
Inspection Date: 07/09/2018
Asset Name: 41-00001
Facility Carried: CR 700S

Bridge Inspection Report

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RIPRAP, SILT, RIV

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Comments:

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(31) DESIGN LOAD
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(63) OPERATING RATING METHOD: 1 - Load Factor (LF)
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Comments:
APPEARS INADEQUATE

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Comments:
IN HORIZONTAL CURVE AND SAG CURVE, 'T' INTERSECTION EAST, HILL TO THE WEST

APPRAISAL
SUFFICIENCY RATING: 77.8
STATUS: 2
(67) STRUCTURAL EVALUATION: 6
(68) DECK GEOMETRY: 3

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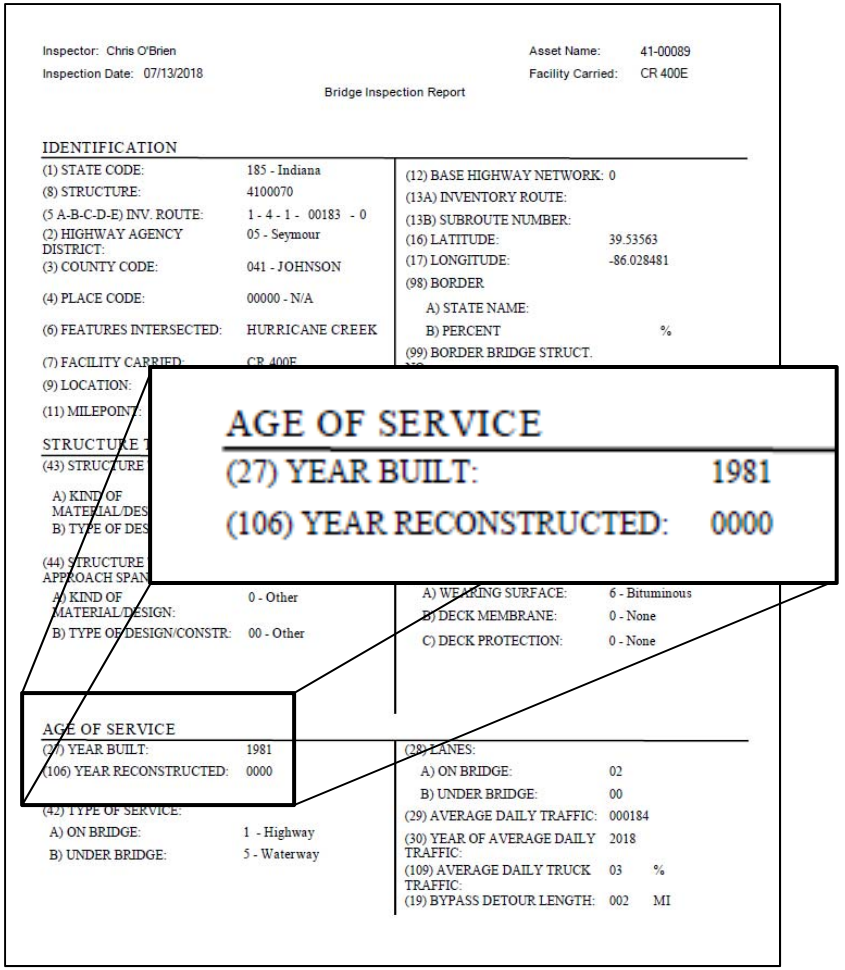
County Summary Reports

Federal Funding Eligibility

- Cannot have been new, replaced, rehabbed, or reconstructed within past:
  - 10 years (replace, rehabilitation)
  - 5 years (preventative maintenance)
  - Funding source doesn't matter (Fed vs. Local)



Inspector: Chris O'Brien
Inspection Date: 07/13/2018
Asset Name: 41-00089
Facility Carried: CR 400E

Bridge Inspection Report

IDENTIFICATION

(1) STATE CODE:	185 - Indiana
(8) STRUCTURE:	4100070
(5 A-B-C-D-E) INV. ROUTE:	1 - 4 - 1 - 00183 - 0
(2) HIGHWAY AGENCY DISTRICT:	05 - Seymour
(3) COUNTY CODE:	041 - JOHNSON
(4) PLACE CODE:	00000 - N/A
(6) FEATURES INTERSECTED:	HURRICANE CREEK
(7) FACILITY CARRIED:	CR 400E
(9) LOCATION:	
(11) MILEPOINT:	

(12) BASE HIGHWAY NETWORK:	0
(13A) INVENTORY ROUTE:	
(13B) SUBROUTE NUMBER:	
(16) LATITUDE:	39.53563
(17) LONGITUDE:	-86.028481
(98) BORDER	
A) STATE NAME:	
B) PERCENT	%
(99) BORDER BRIDGE STRUCT.	

STRUCTURE T

(43) STRUCTURE	
A) KIND OF MATERIAL/DES	
B) TYPE OF DES	
(44) STRUCTURE APPROACH SPAN	
A) KIND OF MATERIAL/DESIGN:	0 - Other
B) TYPE OF DESIGN/CONSTR:	00 - Other

A) WEARING SURFACE:	6 - Bituminous
B) DECK MEMBRANE:	0 - None
C) DECK PROTECTION:	0 - None

AGE OF SERVICE

(27) YEAR BUILT:	1981
(106) YEAR RECONSTRUCTED:	0000

AGE OF SERVICE

(27) YEAR BUILT:	1981
(106) YEAR RECONSTRUCTED:	0000

(42) TYPE OF SERVICE:	
A) ON BRIDGE:	1 - Highway
B) UNDER BRIDGE:	5 - Waterway

(28) LANES:	
A) ON BRIDGE:	02
B) UNDER BRIDGE:	00
(29) AVERAGE DAILY TRAFFIC:	000184
(30) YEAR OF AVERAGE DAILY TRAFFIC:	2018
(109) AVERAGE DAILY TRUCK TRAFFIC:	03 %
(19) BYPASS DETOUR LENGTH:	002 MI

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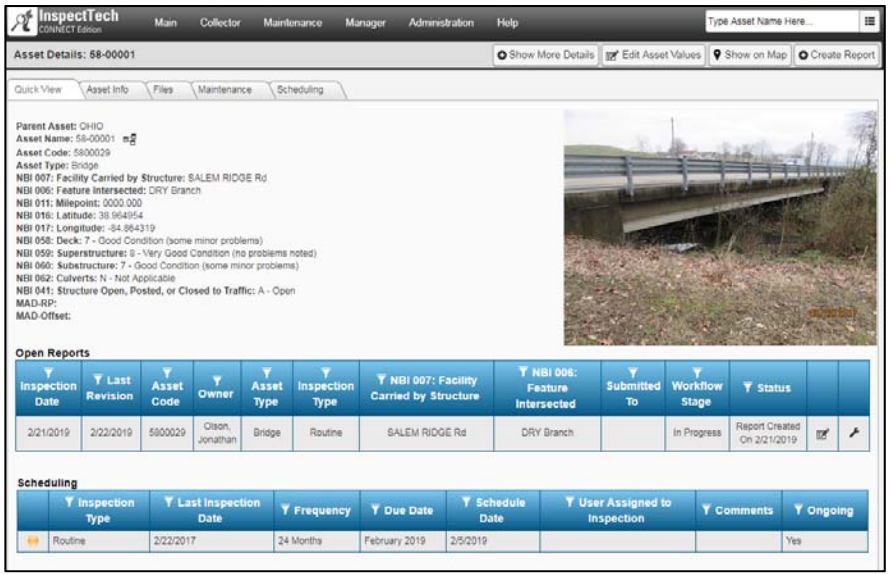
BIAS

- Official location for bridge inspection data
- Always up to date
- Has historical inspection reports
- Powerful query tools
- Link to ERMS files
- LPA encouraged to use



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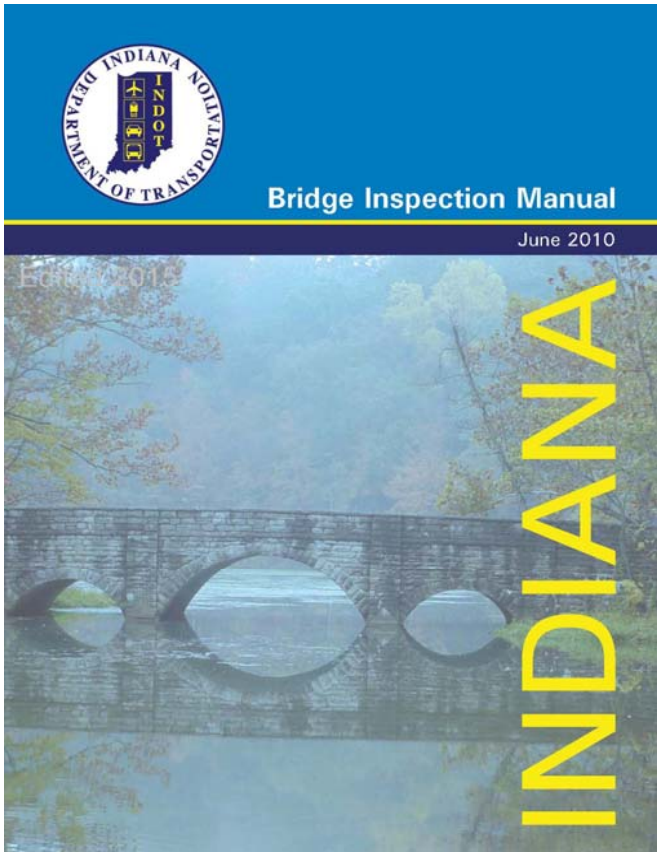
Load Ratings

A Lot of Changes

- All bridges to be re-load rated by October 2019 following new procedures
- Everyone to use AASHTOWare BrR software
  - Or engineering judgment (when details unknown)
- Rating results go into BRADIN, files into ERMS



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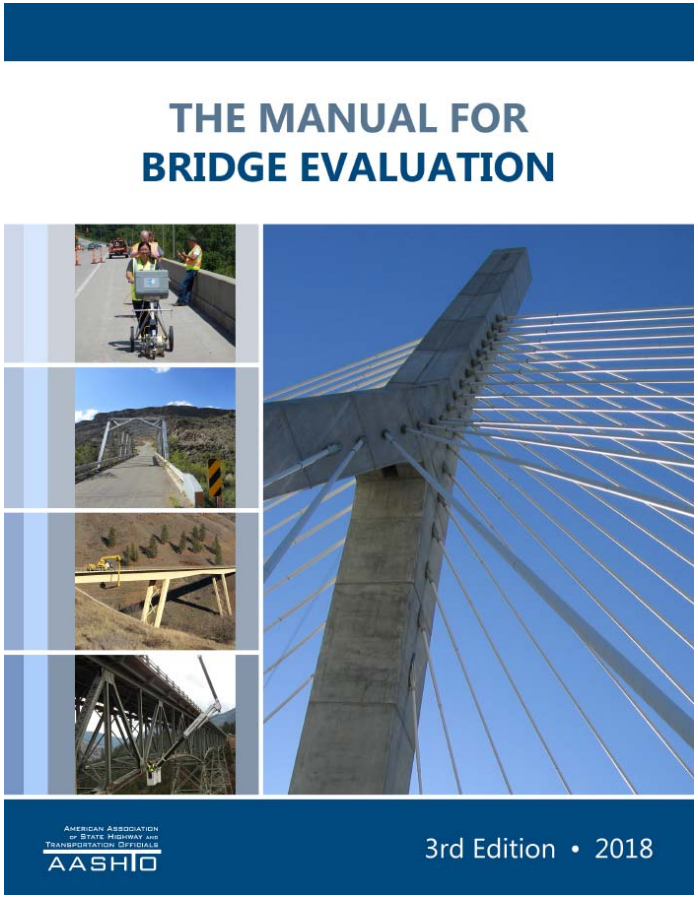
Load Ratings

A Lot of Changes

- Indiana will be more in line with Manual for Bridge Evaluation (MBE), other states
- Approx. 15 new vehicles
  - Vehicles from MBE
  - Legal vehicles in Indiana
  - Emergency vehicles: EV2, EV3
- Only re-rated when change in condition
- New load posting criteria



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Load Ratings

Basic Load Rating Process

1. Load rate bridge for all vehicles
2. Get Rating Factor (RF) for each vehicle:
   - RF > 1.0 is good
   - RF < 1.0 is bad
3. There are two rating levels:
   - Design (Inventory)
   - Legal (Operating)

LEGAL & ROUTINE PERMIT LOADS

Vehicle Configuration	Rating Factors	Load Capacity (tons)	Safe Posting Load (tons)
EV2	1.038	29.84	
EV3	0.679	29.20	
		Single Axle	16.75
		Tandem	21.05
		Gross	29.20
Vehicle Configuration	**Rating Factors**	**Load Capacity (tons)**	**Safe Posting Load (tons)**
NRL	0.805	N/A	N/A
H 20-44	1.124	22.48	22.48
Alternate Military	0.877	21.05	21.05
HS 20-44	0.999	35.96	35.96
AASHTO Type 3	1.238	30.95	30.95
SU4	1.021	27.57	27.57
Toll Road Truck (89.6K)	-	-	-
AASHTO Type 3S2	1.245	44.82	44.82
SU5	0.938	29.08	29.08
Toll Road Truck (90K)	-	-	-
AASHTO Type 3-3	1.503	60.12	60.12
Lane-Type	-	-	-
SU6	0.858	29.82	29.82
Toll Road Truck (126K)	-	-	-
SU7	0.831	32.20	32.20
Michigan Train Truck #5	-	-	-
Michigan Train Truck #8	-	-	-
		Min. Safe Posting Load =	21.05

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Load Ratings

Basic Load Rating Process

4. If Design (Inventory) RF < 1.0:
   - Not designed adequately
   - Designed using older standards
   - Not designed for that vehicle
5. If Legal (Operating) RF < 1.0:
   - Bridge MUST be load posted!

DESIGN LOADS

Vehicle Configuration	Inventory Rating Factors	Load Capacity (tons)
HL-93	-	-
Fatigue	-	-
H 20-44	1.207	24.14
HS 20-44	0.924	33.26
HS-25	0.750	33.75
Alternate Military	0.948	22.75
Toll Road Truck (89.6K)	-	-
Toll Road Truck (90K)	-	-
Toll Road Truck (126K)		

LEGAL & ROUTINE PERMIT LOADS

Vehicle Configuration	Rating Factors	Load Capacity (tons)	Safe Posting Load (tons)
EV2	1.038	29.84	
EV3	0.679	29.20	
		Single Axle	16.75
		Tandem	21.05
		Gross	29.20

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Load Ratings

Basic Load Rating Process

6. Establish safe posting load
   - Use safe posting load equation from MBE
   - Example in LFD code:

     (30 Ton vehicle)

     x (0.8 RF) = 24 Tons
   - Use min. safe posting load
   - Can post at lower levels at discretion of load rating engineer and bridge owner

LEGAL & ROUTINE PERMIT LOADS

Vehicle Configuration	Rating Factors	Load Capacity (tons)	Safe Posting Load (tons)
EV2	1.038	29.84	
EV3	0.679	29.20	
		Single Axle	16.75
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Michigan Train Truck #8	-	-	-
		Min. Safe Posting Load =	21.05

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Load Ratings

Basic Load Rating Process

7. Notify County of changes
8. County required to install signs within 30 days
9. Signs recommended at bridge and nearest intersections
10. Pictures of installed signs needed to update BIAS

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Load Ratings

The Result

- Some bridges being load rated in ways they were never designed for
- Some rating vehicles cause higher stresses than design vehicles
- Some newer bridges in good condition require load posting

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Load Ratings

The Result

- More bridges posted
- Higher posting values
  - less conservative
- How to avoid load posting:
  - Good practice: Design for HL-93 using LRFD
  - Best practice: Check load rating during design

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Scour Evaluations

- All Bridges required to have scour screening and/or assessment on file:
  - Inspector fills out in BIAS
- Bridges on “Moderate Risk” channels require additional evaluation:
  - If foundation known, model with HEC-RAS
  - If foundation unknown, make scour critical

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Scour Evaluations

If Scour Critical:

- Must have Scour Plan of Action (POA) on file
- Monitor bridges during floods:
  - Example: every 12 hours during County Flood Warning announced by National Weather Service
  - Look for damage to bridge and surroundings
  - County to follow directions on POA, fill out log, and keep on file

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LPA's Responsibility

- Develop RFP
  - Start minimum 12 months in advance
  - Longer if in MPO
- Review proposals and select Consultant
- Review and approve
  - LPA-Consultant agreement
  - LPA-INDOT agreement

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LPA's Responsibility

- Each phase:
  - Request FMIS funds
  - Issue NTP (after INDOT OK)
- Process invoices and voucher claims
- Submit local quarterly reports and "attend" phone meetings
- Notify consultant:
  - Initial inspections (new, replace, rehab)
  - Damage to bridges

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LPA's Responsibility

- Provide consultant with any previous and new bridge files
- Address any critical findings or posting changes
- Monitor scour critical bridges following POA
- Review inspection reports and findings
- Use the inventory as a tool to efficiently manage your bridges

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What's New?

- Extended Frequency
  - Being built into newer contracts now
  - If approved, go to 48-month routine
- Some requirements
  - Condition ≥ 6 (deck, super, sub)
  - Steel or concrete bridge (box beams need deck)
  - Load rating Operating RF > 1.0
  - Not fracture critical, no special details
  - No narrow bridges
  - Not at risk of water overtopping

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What's New?

- Compliance Months
  - Likely transitioning to 2 months
- Contract Dates and NTP
  - Trying to get NTP 30-60 days before compliance months
  - May need to terminate or amend existing contracts so there is no overlap
- Statewide reschedule
  - Balance months and years

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References

- INDOT Bridge Inspection Manual (BIM)
- Manual for Bridge Evaluation (MBE)
- LPA Guidance Document
- Asset Management for LPA Bridges
- Indiana Manual on Uniform Traffic Control Devices (MUTCD)
- LPA Consultant Boilerplate Contract for County Bridge Inspections

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Any Questions?

Contact:

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Bridge Project Manager
Butler, Fairman & Seufert, Inc.

jolson@bfsengr.com
317-713-4615

PURDUE ROAD SCHOOL
EST. 1914
TRANSPORTATION CONFERENCE & EXPO

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